What is claimed is:

1. A method for controlling an engine coupled to a transmission having an input speed, an output speed, a current gear, and a next gear, the engine having an engine speed, the method comprising the steps of:

determining a synchronous input speed based on the current gear and a parameter indicative of the transmission output speed;

producing a first indication that a gear ratio change from the current gear to the next gear has been initiated; and

in response to the first indication, adjusting an engine operating parameter to control the engine speed such that the input speed is maintained at or below the synchronous input speed.

2. The method of claim 1 wherein current gear has a first gear ratio, the next gear has a second gear ratio that is greater than the first gear ratio.

3. The method of claim 1, further comprising the steps of:

determining a second synchronous input speed based on the next gear and a parameter indicative of the transmission output speed; and

adjusting an engine operating parameter to increase progressively the engine speed such that the input speed is maintained at or below the second synchronous input speed during the gear ratio change.

4. The method of claim 1, wherein the transmission has a torque converter turbine speed coupled to the engine speed, and the gear ratio is produced by disengaging an offgoing friction element, the method further comprising the steps of:

determining a second synchronous input speed based on the next gear and a parameter indicative of the transmission output speed

producing a second indication that the turbine speed is greater than the synchronous input speed; and

in response to the second indication, adjusting an engine operating parameter to increase the engine speed such that the input speed is maintained at or below the second synchronous input speed.

5. The method of claim 1 wherein said engine operating parameter is an engine output torque.

6. The method of claim 1 wherein said engine operating parameter is an engine airflow.

7. The method of claim 1 wherein said engine operating parameter is a throttle position of the engine.

8. The method of claim 1 wherein said engine operating parameter is an ignition timing.

9. The method of claim 1 wherein said engine operating parameter is an engine air-fuel ratio.

10. The method of claim 1 wherein said engine operating parameter is fuel flow.

11. A method for controlling a powertrain that includes an engine, automatic transmission having an offgoing friction element to be disengaged during a gear ratio change, and a torque converter having a turbine, the method comprising the steps of:

initiating a gear ratio change from a current gear ratio to a next gear ratio;

determining a value representing a desired engine speed until disengagement of the offgoing friction element is detected;

determining a rate of increase of desired engine speed during a period following detection of the disengagement of the offgoing friction element;

increasing the desired engine speed value at the start of the period by said determined rate of increase of desired engine speed during the period; and

using the desired engine speed value to control engine speed during the gear ratio change.

12. The method of claim 11, wherein the step of determining a value representing a desired engine speed until disengagement of the offgoing friction element is detected, further comprises the steps of:

determining a predicted current gear synchronous speed, and an offset to the current gear synchronous speed;

setting the desired engine speed equal to the predicted current gear synchronous speed plus an offset to the current gear synchronous speed; and

further comprising using the desired engine speed value to control engine speed until disengagement of the offgoing friction element is detected during the gear ratio change.

13. The method of claim 11, wherein the step of determining a value representing a desired engine speed until disengagement of the offgoing friction element is detected, further comprises the steps of:

determining a predicted current gear synchronous speed, and an offset to the current gear synchronous speed;

determining a predicted target turbine speed;

setting the desired engine speed equal to the sum of the offset to the current gear synchronous speed plus the greater of the predicted target turbine speed and the predicted current gear synchronous speed; and

further comprising using the desired engine speed value to control engine speed until disengagement of the offgoing friction element is detected during the gear ratio change.

14. The method of claim 11, wherein the step of determining a rate of increase of desired engine speed during the period following detection of the disengagement of the offgoing friction element, further comprises the steps of:

determining a target desired engine speed during the period;

determining a desired engine speed at the beginning of the period;

determining the length of the period that corresponds to the current gear ratio;

calculating the time rate of change of desired engine speed during the period by dividing the difference between the target desired engine speed and the desired engine speed at the beginning of the period by the length of the period.

15. The method of claim 11 wherein the step of determining a rate of increase of desired engine speed during the period following detection of the disengagement of the offgoing friction element, further comprises the steps of:

determining a predicted current gear synchronous speed, and an offset to the current gear synchronous speed;

determining a predicted target turbine speed;

determining the length of the period that corresponds to the current gear ratio; and

calculating the time rate of change of desired engine speed during the period by dividing the difference between the sum of the offset to the current gear synchronous speed plus the greater of the predicted target turbine speed and the predicted current gear synchronous speed by the length of the period.

16. The method of claim 11 wherein the step of increasing the desired engine speed value at the start of the period by said determined rate of increase during the period, further comprises the step of:

repetitively increasing at frequent intervals the desired engine speed value a last interval by the time rate of change of desired engine speed.

17. The method of claim 11, further comprising the steps of:

determining a next gear synchronous speed, and a threshold of the next gear synchronous speed;

determining a target engine speed based at least on at least in part the next gear synchronous speed; and

discontinuing use of the desired engine speed value to control engine speed during the gear ratio change when the turbine speed is within the threshold of the next gear synchronous speed for a predetermined period.

18. The method of claim 11, further comprising the steps of:

determining a predicted turbine speed;

determining a next gear synchronous speed, and a threshold of the next gear synchronous speed; and

generating a command to produce an engine speed that is the lesser of the predicted turbine speed and the next gear synchronous speed; and

discontinuing use of the desired engine speed value to control engine speed during the gear ratio change when the turbine speed is within the threshold of the next gear synchronous speed for a predetermined period.

19. A method for controlling coasting downshifts in a vehicular powertrain that includes an internal combustion engine coupled to an automatic transmission for producing multiple gear ratios and having a rotating torque converter turbine driveably connected to the transmission input and hydrokinetically connected to an engine, the

powertrain also including an electronic controller in communication with the engine and the automatic transmission for controlling disengagement of an offgoing friction element, engagement of an oncoming friction element, and engine speed during a gear ratio, the method comprising the steps of:

generating a command to initiate a ratio change from a current gear ratio to a next gear ratio;

determining a predicted current gear synchronous speed, and an offset to the current gear synchronous speed;

generating, until disengagement of the offgoing friction element is detected, a command to produce an engine speed based at least in part on the predicted current gear synchronous speed and the offset to the current gear synchronous speed.

20. The method of claim 19, further comprising the steps of:

determining a next gear synchronous speed;

determining a rate of increase of engine speed over a predetermined period following detection of the disengagement of the offgoing friction element; and

generating at frequent intervals a command to produce an engine speed that is increased periodically at said rate of increase.

21. The method of claim 19 wherein the step of determining a rate of increase of engine speed, further comprises the steps of:

determining a time rate of increase of engine speed to occur following detection of the disengagement of the offgoing friction element based at least in part on the difference between the value of next gear synchronous speed and the value of the predicted current gear synchronous speed plus the offset to the current gear synchronous speed.

22. The method of claim 19, wherein the step of determining a value representing a desired engine speed until disengagement of the offgoing friction element is detected, further comprises the steps of:

determining a predicted current gear synchronous speed, and an offset to the current gear synchronous speed;

setting the desired engine speed equal to the predicted current gear synchronous speed plus an offset to the current gear synchronous speed; and

further comprising using the desired engine speed value to control engine speed until disengagement of the offgoing friction element is detected during the gear ratio change.

23. The method of claim 19, wherein the step of determining a value representing a desired engine speed until disengagement of the offgoing friction element is detected, further comprises the steps of:

determining a predicted current gear synchronous speed, and an offset to the current gear synchronous speed;

determining a predicted target turbine speed;

setting the desired engine speed equal to the sum of the offset to the current gear synchronous speed plus the greater of the predicted target turbine speed and the predicted current gear synchronous speed; and

further comprising using the desired engine speed value to control engine speed until disengagement of the offgoing friction element is detected during the gear ratio change.

24. A system comprising:

an internal combustion engine having an engine speed;

a transmission having transmission having an input speed, an output speed, a current gear, and a next gear, the transmission coupled to said engine; and

a controller determining a synchronous input speed based on the current gear and a parameter indicative of the transmission output speed, indicating whether a gear ratio change from the current gear to the next gear has been initiated, and in response to said indication, adjusting an engine operating parameter to control the engine speed such that the input speed is maintained at or below said synchronous input speed.

25. The system of claim 24, further comprising a controller further determining a second synchronous input speed based on the next gear and a parameter indicative of the transmission output speed, and adjusting an engine operating parameter to increase progressively the engine speed such that the input speed is maintained at or below the second synchronous input speed during the gear ratio change.

26. The method of claim 24, wherein the transmission has a torque converter turbine speed coupled to the engine speed, and the gear ratio is produced by disengaging an offgoing friction element, the system further comprising a controller:

determining a second synchronous input speed based on the next gear and a parameter indicative of the transmission output speed;

producing a second indication that the turbine speed is greater than the synchronous input speed; and

in response to the second indication, adjusting an engine operating parameter to increase the engine speed such that the input speed is maintained at or below the second synchronous input speed.

27. The system of claim 24 wherein the engine operating parameter adjusted by the controller is an engine output torque.

28. The system of claim 24 wherein the engine operating parameter adjusted by the controller is an engine airflow.

29. The system of claim 24 wherein the engine operating parameter adjusted by the controller is a throttle position of the engine.

30. The system of claim 24 wherein the engine operating parameter adjusted by the controller is an ignition timing.

31. The system of claim 24 wherein the engine operating parameter adjusted by the controller is an engine air-fuel ratio.